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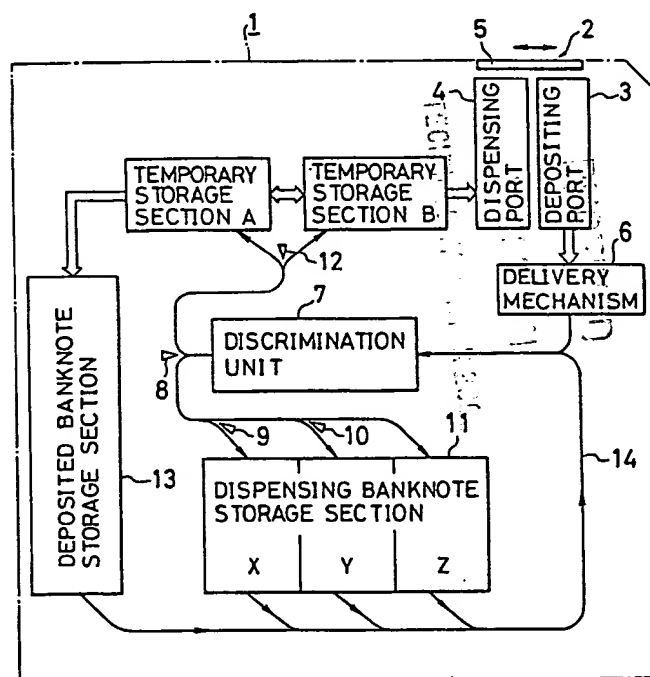
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EP A2 0109743

(58) Field of search  
G4X  
G4V  
Selected US specifications from IPC sub-class G07F

(54) A dealing port mechanism for a bank-note depositing and dispensing machine

(57) A depositing port 3 and a dispensing port 4 are disposed adjacent to each other in a bank-note depositing and dispensing machine 1. A single slidable shutter 5 is provided to selectively cover one or both of the dispensing port 4 and the depositing port 3.

FIG. 1



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FIG. 1

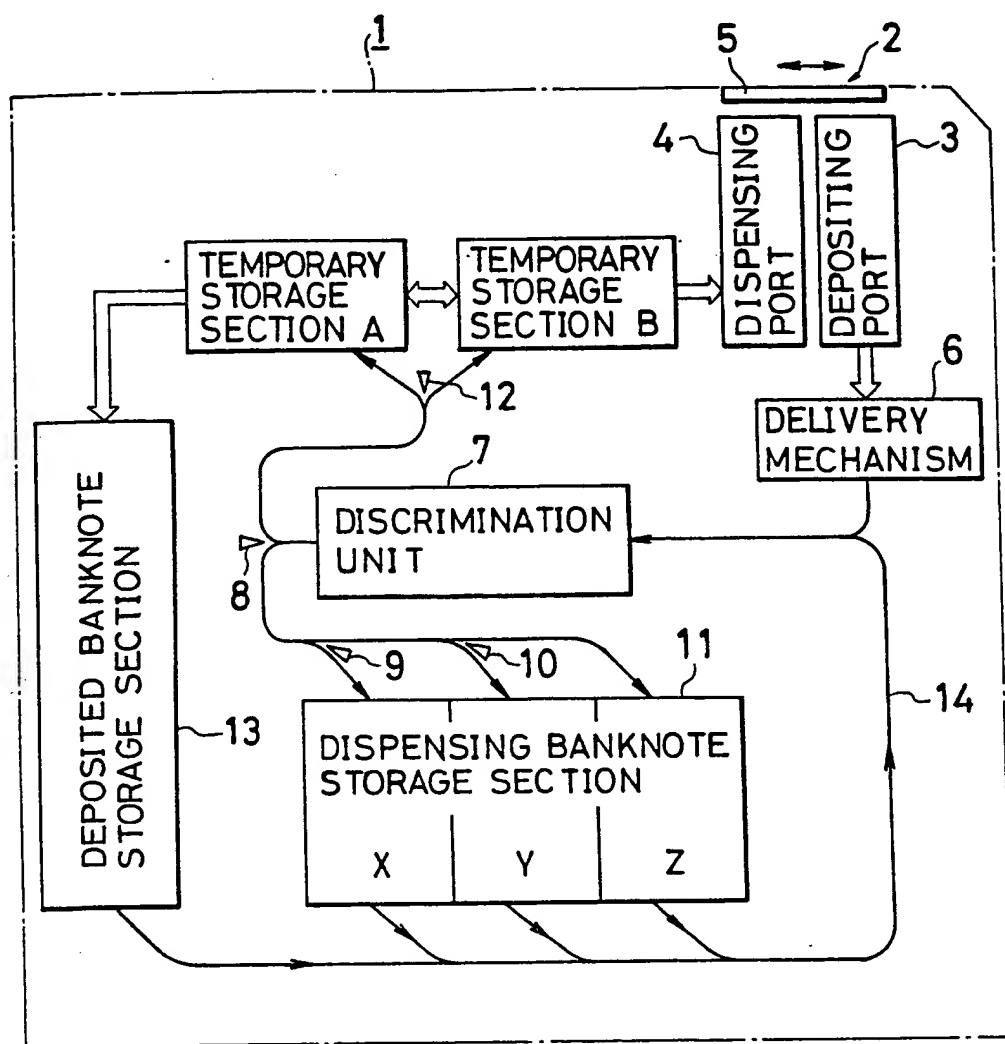


FIG. 2

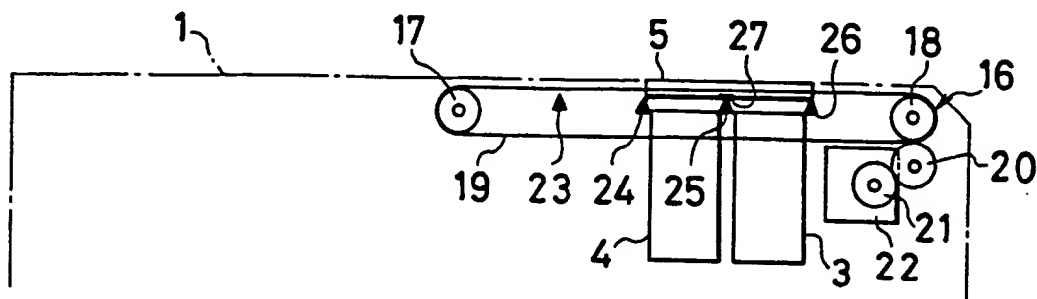


FIG. 3

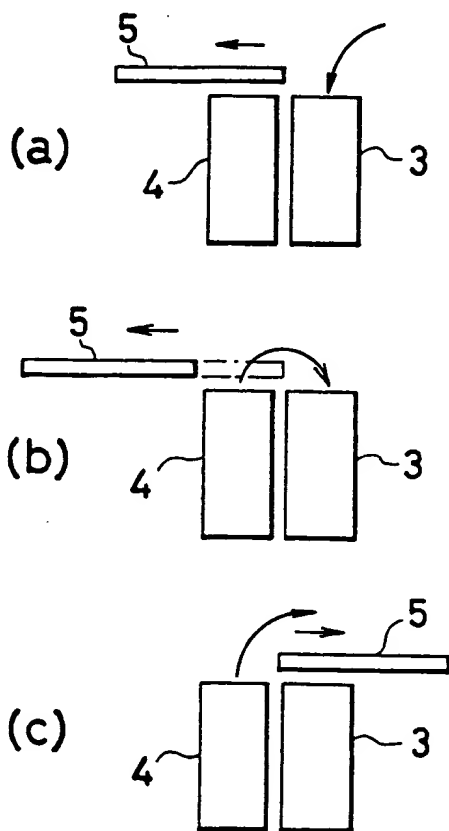
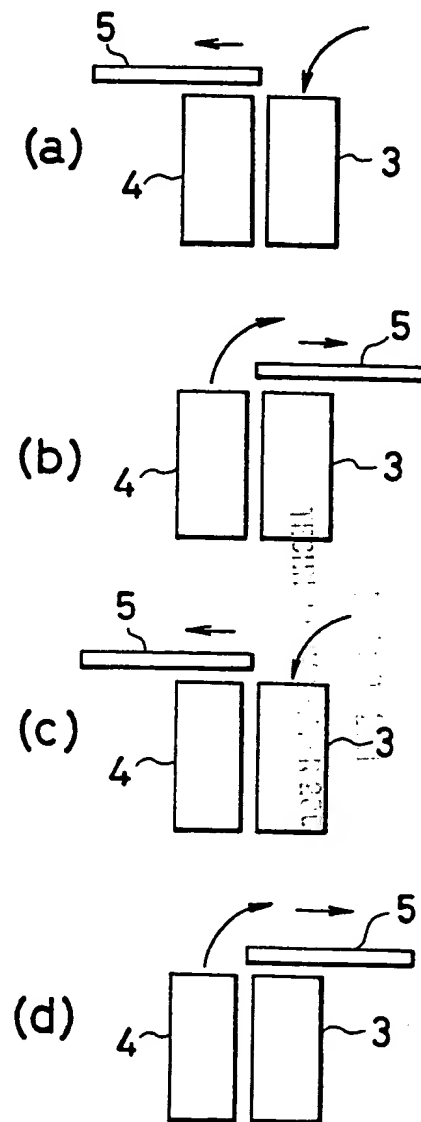


FIG. 4



# SPECIFICATION

## A dealing port mechanism for a bank-note depositing and dispensing machine

5 The present invention relates to a dealing port mechanism for depositing and dispensing bank-notes in a bank-note depositing and dispensing machine having the function of handling deposited bank-notes and of handling bank-notes to be dispensed and, for example, to a simplified design of a mechanism necessary for depositing and dispensing bank-notes and of a mechanism for opening and closing dealing ports, as well as for facilitating the handling thereof by clients.

10 Today, numerous bank-note depositing and dispensing machines are used having the function of handling deposited bank-notes and of dispensing bank-notes.

20 In the early days of development, such bank-note depositing and dispensing machines were so arranged that a handling machine used exclusively for depositing and a handling machine used exclusively for dispensing were merely arranged and housed together in a frame and, as for dealing ports, one used exclusively for depositing (depositing port) and one used exclusively for dispensing (dispensing port) were arranged separately and apart from each other.

30 However, if the depositing port and the dispensing port are arranged apart from each other, in cases where the handling of deposited bank-notes and the dispensing of bank-notes are carried out continuously, a client (operator) had to give his attention to both dealing ports, and also had to change his posture or move depending on whether he wished to effect a depositing or a dispensing operation. Thus, such an arrangement presented the client with some difficulty since the handling efficiency was poor.

40 In addition, if a handling machine used exclusively for depositing and a handling machine used exclusively for dispensing are simply arranged and housed together in one frame, a deposited bank-note storage section for storing deposited bank-notes and a dispensing bank-note storage section for storing bank-notes ready for dispensing are both required to have a capacity equivalent to that of a conventional machine used exclusively for depositing or a machine used exclusively for dispensing, so that there was a problem in that the unavoidable tendency was for the overall machine to become large in size.

55 In recent years, therefore, a bank-note depositing and dispensing machine has been developed which is adapted to be capable of effecting depositing and dispensing of bank-notes from a single dealing port by combining the depositing port with the dispensing port, thus facilitating handling by clients. Also, another type of bank-note depositing and dispensing machine has been developed in which the capacities of the deposited bank-note storage section and the dispensing bank-note storage section are reduced by circulating deposited bank-notes to the dispensing bank-note storage

section so as to make immediate use of the deposited bank-notes as payable ones, thereby making the machine compact.

70 If an arrangement is made to effect depositing and dispensing of bank-notes from a single dealing port, as described above, the machine is easy to handle and is convenient from the standpoint of the clients. On the other hand, however, the conveying direction of a conveying passage communicating with the dealing port must be reversible, or a delivery mechanism must be provided for delivering one by one bank-notes deposited in the dealing port for the purposes of discrimination and counting, thereby the conveying passage communicating with the dealing port must be able to carry out both the function of handling deposited bank-notes and of dispensing bank-notes. Hence, there has been a drawback in that the peripheral mechanisms of the dealing port which are necessary for depositing and dispensing operations unnecessarily become overly complicated.

85 The invention provides a dealing port mechanism for depositing and dispensing bank-notes in a depositing and dispensing machine having the function of handling deposited bank-notes and of dispensing bank-notes, wherein a depositing port and a dispensing port are disposed adjacent to each other as dealing ports, and the opening and closing of the depositing port and the dispensing port is controlled by sliding a single shutter plate capable of covering both ports in the direction of the juxtaposition of the depositing port and the dispensing port.

100 In such an arrangement, since the depositing port and the dispensing port are disposed adjacent to each other as dealing ports, even in cases where the handling of deposited bank-notes and the dispensing of bank-notes are carried out continuously, a client need not change his posture or move, irrespective of whether he is performing a depositing or dispensing operation, and operation by the client can thus be facilitated.

105 An embodiment of the invention will now be described by way of example and with reference to the accompanying drawings, in which:

110 *Figure 1* is a schematic diagram of an embodiment of a circulating-type bank-note depositing and dispensing machine to which the present invention is applied;

115 *Figure 2* is an explanatory diagram of the arrangement of essential portions of the bank-note depositing and dispensing machine illustrated in *Figure 1*;

120 *Figures 3 (a) to (c)* are diagrams explaining one embodiment of controlling the operations of opening and closing a shutter plate, and

125 *Figures 4 (a) to (d)* are diagrams explaining another embodiment of controlling the operations of opening and closing the shutter plate.

130 *Figure 1* shows a bank-note depositing and dispensing machine 1 which has the function of handling deposited bank-notes and the function of handling bank-notes to be dispensed and is of a circulating type in which, after a predetermined handling of deposited bank-notes, the deposited

bank-notes are utilized as dispensable ones.

A dealing port mechanism 2 is designed to deposit and dispense bank-notes in the aforementioned bank-note depositing and dispensing machine 1, and has a depositing port 3 and a dispensing port 4 which are disposed adjacent to each other as dealing ports, and the opening and closing of the depositing port 3 and the dispensing port 4 is controlled by sliding a single shutter plate 5 capable of covering both the depositing port 3 and the dispensing port 4 in the direction of the arrangement of the depositing port 3 and the dispensing port 4 (horizontally as viewed in Figure 1).

Before describing this dealing port mechanism 2 in detail, a brief description will be given of the functions of the aforementioned bank-note depositing and dispensing machine 1. When a client gives an instruction for depositing bank-notes and bank-notes are deposited in the depositing port 3, the bank-notes are delivered one by one to a delivery mechanism 6 and sent to a discriminating unit 7, where the types of bank-note are discriminated, judgment is made as to whether or not each bank-note is acceptable, and the counting of the bank-notes is carried out. The bank-notes which are judged to be acceptable in the discrimination unit 7 are stored in the specified storage sections X, Y, and Z of a dispensing bank-note storage section 11 in accordance with each of the denominations provided for by means of distributing mechanisms 8, 9 and 10 or stored in a deposited bank-note storage section 13 via distributing mechanisms 8, 12 and a temporary storage section A. On the other hand, bank-notes which are judged by the discrimination unit 7 to be unacceptable are returned to the dispensing port 4 via the distributing mechanisms 8, 12 and a temporary storage section B.

In addition, when the client gives an instruction for dispensing, a specified amount of bank-notes are delivered from the dispensing bank-note storage section 11 to the dispensing port 4 via a route 14 passing through the discrimination unit 7 and via the distributing mechanisms 8, 12 and the temporary storage section B. Incidentally, this bank-note depositing and dispensing machine 1 is adapted so as to be capable of moving bank-notes contained in the deposited bank-note storage section 3 to the dispensing bank-note storage section 11 via the route 14, the discrimination unit 7, and the distributing mechanisms 8, 9.

As shown in Figure 2, the dealing port mechanism installed in such a bank-note depositing and dispensing machine 1 supports a shutter plate 5 for movement in the direction of the juxtaposition of the depositing port 3 and the dispensing port 4 (horizontally as viewed in Figure 2, and hereinafter referred to as the opening and closing direction), and controls the advancing and retracting of the shutter plate 5 in the opening and closing direction thereof by means of a reciprocating mechanism 16.

The reciprocating mechanism 16 is arranged such that a portion of the shutter plate 5 is connected to an endless belt 19 (a chain or a wire is also usable) which is mounted on rotary members 17, 18, which are pulleys or sprockets, in the open-

ing and closing direction of the shutter plate 5, and the belt 19 is rotatably driven by a motor 22 via power transmitting rotary members 20, 21, thereby advancing or retracting the shutter plate 5 in the opening and closing direction. The amount of rotation of the motor 22 in the rotating direction thereof is controlled on the basis of the detected values of four position detecting sensors 23, 24, 25 and 26 disposed below the shutter plate 5 and spaced along the opening and closing direction of the shutter plate 5.

The position detecting sensors 23, 24, 25 and 26 detect the position of the shutter plate 5 by detecting the position of a reference portion 27 set on the underside of the shutter plate 5, and are arranged such that the movement of the shutter plate 5 is controlled on the basis of the detected values of these position detecting sensors 23, 24, 25 and 26, and normally (when they are not used for depositing and dispensing bank-notes) both the depositing port 3 and the dispensing port 4 are closed, but both of the dealing ports can be open at the same time, or either one can be open, as necessary.

Hereinafter, an embodiment of the opening and closing control of each dealing port 3, 4 of the dealing port mechanism 2 will be described with reference to Figures 3(a) to (c) and Figures 4(a) to (d).

Figures 3(a) to (c) show one embodiment of controlling the operations of the opening and closing actions of the shutter plate 5. Each drawing will be explained in sequence. When the client gives an instruction for depositing bank-notes, the shutter plate 5 first moves to the side of the dispensing port 4 and opens only the depositing port 3, as shown in Figure 3(a). In this case, the position where the shutter plate 5 stops is the position where the aforementioned reference portion 27 is located immediately above the position detecting sensor 24, and the motor 22 is stopped by a signal from the position detecting sensor 24.

Next, bank-notes are deposited in the depositing port 3, the shutter plate 5 is returned to its original position, and the depositing port 3 and the dispensing port 4 are both closed, upon which the handling of deposited bank-notes starts. Of the deposited bank-notes, those bank-notes that are judged in the discrimination unit 7 to be unacceptable (i.e., rejected bank-notes) are returned to the client through the dispensing port 4.

Provisions are made for two cases with regard to the return of rejected bank-notes.

The first case is where a rejected bank-note, which is returned to the dispensing port 4, is redeposited in the depositing port 3 by the client and rediscriminated. In this case, as shown in Figure 3(b), when the rejected bank-note is again returned, the shutter plate 5 moves to the outside of the dispensing port 4 as far as it can so as to open both the depositing port 3 and the dispensing port 4. In this case, the position where the shutter plate 5 stops is the position where the reference portion 27 is located immediately above the position detecting sensor 23, and the motor 22 is stopped by

a signal from the position detecting sensor 23. In this case, when the bank-note returned to the dispensing port 4 is taken out by the client, an arrangement may be provided to close the dispensing port 4, as shown by the chain dot line in Figure 3(b).

The second case is where a rejected bank-note returned to the dispensing port 4 is not rediscriminated. In this case, as shown in Figure 3(c), the shutter plate 5 moves to the side of the depositing port 3, and only the dispensing port 4 is opened. In this case, the position where the shutter plate 5 stops is where the reference portion 27 is located immediately above the position detecting sensor 26, and the motor 22 is stopped by a signal from the position detecting sensor 26.

The control of the operations of the opening and closing actions of the shutter plate 5 at the time of depositing can be effected as shown in Figures 4(a) to (d).

Figure 4(a) shows a state at the time when the client deposits bank-notes, while Figure 4 (d) shows a case where a rejected bank-note returned to the client from the dispensing port 4 is not rediscriminated. These states are the same as those shown in Figure 3. In the embodiment shown in Figure 4 (a) to (d), however, when rediscriminating a rejected bank-note, the rejected bank-note is taken out by opening only the dispensing port 4, as shown in Figure 4(b), and then only the depositing port 3 is opened to redeposit the bank-note, as shown in Figure 4(c). As compared with the control shown in Figures 3(a) to (c), in which both dealing ports are opened to rediscriminating a rejected bank-note, the control illustrated in Figure 4(a) to (d) is capable of indicating the confirmation procedure more clearly to the client.

The above is a description of the control of the operations of the opening and closing actions of the shutter plate 5 at the time of depositing bank-notes. Regarding the dispensing of bank-notes, since it suffices if the state shown in Figure 3(c) or Figure 4(d) is established, description thereof will be omitted.

According to the dealing port mechanism 2 having the above-described arrangements, since the depositing port 3 and the dispensing port 4 are disposed adjacent to each other, even if the handling of deposited bank-notes and the dispensing of bank-notes are carried out continuously, the client need not change his posture or move, irrespective of whether he is performing a depositing or dispensing operation, and handling by the client can thus be facilitated.

In addition, in the above-described dealing port mechanism 2, the mechanism required in handling deposited bank-notes and the mechanism required in handling bank-notes to be dispensed can be made independent of each other, so that the respective mechanisms may be provided with the minimum of functions as exclusive-use mechanisms. Consequently, the mechanisms necessary for handling deposited and dispensing bank-notes can be made simple, and the control thereof can be effected by a simple system.

Furthermore, in the above-described dealing port mechanism, a mechanism for opening and closing a dealing port may be the reciprocating mechanism 16 for rectilinearly advancing and retracting the shutter plate 5 in the direction of the juxtaposition of the depositing port 3 and the dispensing port 4 and a control unit for operating the reciprocating mechanism 16 in response to an instruction given by the client. Furthermore, the control unit may be capable of setting the amount of movement of the shutter plate 5 and changing the direction of movement, so that the number of functions required of it can be made relatively small. Therefore, the mechanism for opening and closing the dealing port can, as a whole, be simplified.

In addition, in making the aforementioned arrangement, if the opening/closing timing of the depositing and dispensing ports 3, 4 is controlled while detecting the position of the shutter plate 5, the movement of the shutter plate can indicate to the client whether the machine is ready for a depositing or a dispensing procedure, thereby preventing the occurrence of such inconveniences as mistaking one procedure for another.

In the aforementioned embodiments, although the bank-note depositing and dispensing machine 1 of a circulating type has been illustrated, the dealing port mechanism 2 can be used for a bank-note depositing and dispensing machine of a non-circulating type in which deposited bank-notes are not utilized as payable ones.

## CLAIMS

1. A dealing port mechanism for depositing and dispensing bank-notes in a bank-note depositing and dispensing machine having the function of handling deposited bank-notes and of handling bank-notes to be dispensed, wherein a depositing port and a dispensing port are disposed adjacent to each other as dealing ports, and the opening and closing of the depositing port and the dispensing port is controlled by the sliding of a single shutter plate capable of covering both ports in the direction of the juxtaposition of the depositing port and the dispensing port.

2. A dealing port mechanism substantially as herein described with reference to and as shown in the accompanying drawings.